

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Art Unit: 2135 Conf. No.: 7377

Kenneth L. Levy

Application No.: 09/810,080

Filed: March 16, 2001

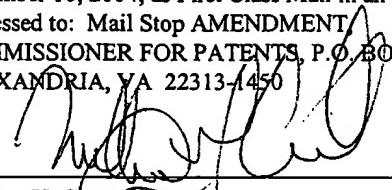
For: TRANSMARKING OF MULTIMEDIA
SIGNALS

Examiner: Son, Linh L D

Date: December 10, 2004

CERTIFICATE OF MAILING

I hereby certify that this paper and the documents referred to as being attached or enclosed herewith are being deposited with the United States Postal Service on December 10, 2004, as First Class Mail in an envelope addressed to: Mail Stop AMENDMENT
COMMISSIONER FOR PATENTS, P.O. BOX 1450,
ALEXANDRIA, VA 22313-1450



William Y. Conwell
Attorney for Applicant

TRANSMITTAL LETTER

Mail Stop AMENDMENT
COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

Enclosed are an Amendment, Exhibit A, Information Disclosure Statement, Form PTO-1449 and cited references. The fee has been calculated as shown and deposit account authorization is given below.

CLAIMS AS AMENDED

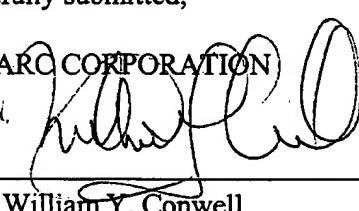
For	No. after amendment	No. paid for previously	Present Extra	Rate	Fee
Total Claims	20	20	= -0-	\$50.00	\$0.00
Indep. Claims	4	4	= -0-	\$200.00	\$0.00
One-month Extension of Time					\$120.00
TOTAL ADDITIONAL FEE FOR THIS AMENDMENT					\$120.00

- Applicant petitions for an extension of time for the number of months indicated above. If an additional extension of time is required, please consider this a petition therefore.
- Charge \$300.00 (fee for IDS and extension of time) and any additional fees which may be required in connection with filing these papers and any extension of time, or credit any overpayment, to Deposit Account No. 50-3284.

Respectfully submitted,

DIGIMARC CORPORATION

By _____


 William Y. Conwell
Registration No. 31,943

Date: December 10, 2004

CUSTOMER NUMBER 23735

 Phone: 503-469-4800
 FAX 503-469-4777

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Kenneth L. Levy

Application No.: 09/810,080

Filed: March 16, 2001

For: TRANSMARKING OF MULTIMEDIA
SIGNALS

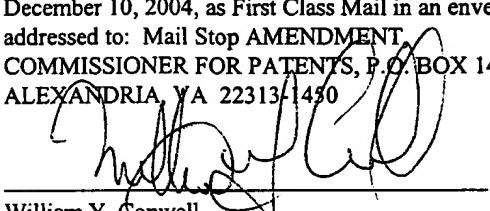
Examiner: Son, Linh L D

Date: December 10, 2004

Art Unit: 2135 Conf. No.: 7377

CERTIFICATE OF MAILING

I hereby certify that this paper and the documents referred to as being attached or enclosed herewith are being deposited with the United States Postal Service on December 10, 2004, as First Class Mail in an envelope addressed to: Mail Stop AMENDMENT, COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450



William Y. Conwell
Attorney for Applicant

AMENDMENT

MAIL STOP AMENDMENT
COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Responsive to the Office Action dated August 10, 2004, please amend the subject application as follows:

In the Specification:

Rewrite the paragraph at page 1, lines 3-8, to read as follows:

This patent application claims the benefit of U.S. Provisional Patent Application No. 60/190,481, entitled Embedded Data and Data Scrambling Improvements, filed March 18, 2000 by Ken Levy, which is incorporated by reference. This patent application is also a continuation in part of U.S. Patent Application No. 09/563,664, entitled Connected Audio and Other Media Objects, filed May 2, 2000, by Ken Levy and Geoff Rhoads (now patent 6,505,160), which is hereby incorporated by reference.

Rewrite the paragraph at page 2, lines 8-14, to read as follows:

Several particular watermarking techniques have been developed, and, for robust watermarks, the goal is to design an imperceptible watermark that survives transformation. However, this cannot always be accomplished. The reader is presumed to be familiar with the literature in this field. Particular techniques for embedding and detecting imperceptible watermarks in media signals are detailed in the assignee's co-pending application serial number 09/503,881 (now patent 6,614,914) and US Patent 5,862,260, which are hereby incorporated by reference.

Rewrite the paragraph at page 5 line 20, through page 6 line 3, to read as follows:

Fig. 1 is a flow diagram illustrating a process of transmarking. The input to the transmarking process is a digitally watermarked signal 20, such as an audio signal (e.g., a music track), a video signal, or still image. The digital watermark carries a message payload of one or more symbols (e.g., binary or M-ary symbols) conveying information such as a content identifier, transaction identifier, database index, usage or copy control

parameters (flags instructing a device or process not to copy, copy once, not to transfer, etc.). There are a variety of applications for digital watermarks in multimedia content, including forensic tracking, broadcast monitoring, copy control, and using the watermark as a trigger for or link to interactive content to be rendered along with the watermarked signal, either in response to user input or automatically as the watermarked signal is playing. Some of these applications are discussed in co-pending patent applications 09/571,422, 09/563,664 (now patent 6,505,160), and 09/574,726, and 09/597,209 (now patent 6,411,725), which are hereby incorporated by reference.

In the Claims:

1. (Original) A method of transmarking a media signal previously embedded with a first digital watermark using a first digital watermark embedding method, comprising:
 - detecting the first digital watermark in the media signal;
 - embedding message information from the first digital watermark into a second digital watermark in the media signal before the media signal undergoes a transformation process such that the second digital watermark is adapted to survive the transformation process.
2. (Original) The method of claim 1 wherein the second digital watermark is increased in amplitude relative to the first digital watermark to survive the transformation process.
3. (Original) The method of claim 1 wherein the second digital watermark is embedded using a different steganographic embedding method than the first digital watermark embedding method.
4. (Original) The method of claim 1 wherein the first digital watermark is at least partially removed before embedding the second digital watermark.
5. (Original) The method of claim 1 wherein the message information includes message symbols and further including:
 - decoding the message symbols from the first watermark; and
 - re-embedding the message symbols from the first watermark into the second watermark.
6. (Original) The method of claim 5 wherein the message symbols include an index to a database entry that stores information about the media signal.
7. (Original) The method of claim 5 wherein the message symbols include a content identifier.

8. (Original) The method of claim 1 wherein the second digital watermark is embedded using a robustness parameter that is used to control embedding so that the second digital watermark is adapted to survive the transformation process; and the robustness parameter is specified by a rendering, editing or transmission process that is going to process the media signal after the second digital watermark is embedded in the media signal such that the second digital watermark is adapted to robustness constraints of the rendering, editing or transmission process.

9. (Original) The method of claim 8 wherein the robustness parameter specifies watermark signal strength, redundancy, or frequency domain locations of the second digital watermark so that the second digital watermark is more likely to survive the transformation process than the first digital watermark.

10. (Original) The method of claim 1 wherein the second digital watermark is embedded using a perceptual quality parameter that is used to control embedding so that the second digital watermark has a perceptual quality adapted for the transformation process; and wherein the perceptual quality parameter is specified by a rendering, editing or transmission process that is going to process the media signal after the second digital watermark is embedded in the media signal such that the second digital watermark is adapted to perceptual quality constraints of the rendering, editing or transmission process.

11. (Original) The method of claim 1 wherein the second digital watermark is embedded using a feedback process that repeatedly embeds at least portions of the second digital watermark and selectively adjusts the strength of the second digital watermark in portions of the media signal according to degradation of the watermark measured after applying a degradation process to the watermarked signal or according to perceptual quality measurements.

12. (Original) A computer readable medium on which is stored software for performing the method of claim 1.

13. (Original) A method of transmarking a media signal previously embedded with a first digital watermark using a first digital watermark embedding method, comprising:
detecting the first digital watermark in the media signal;
converting the media signal to a different format;
embedding message information from the first digital watermark into a second digital watermark in the converted media signal such that the second digital watermark is adapted to robustness or perceptibility parameters associated with the new format.

14. (Original) The method of claim 13 wherein the new format is a compressed format of the media signal.

15. (Original) The method of claim 13 wherein the second digital watermark is encoded with greater signal strength than the first digital watermark to survive transformation of the media signal in the new format.

16. (Currently Amended) The method of claim 13 wherein the second digital watermark is encoded with lesser signal strength than the ~~firs~~ ~~first~~ digital watermark so as to be less perceptible in the new format of the media signal.

17. (Original) The method of claim 13 wherein at least a portion of the first digital watermark is removed before converting the media signal to the different format.

18. (Original) A computer readable medium having software for performing the method of claim 13.

19. (Original) A transmarker for transmarking a media signal previously embedded with a first digital watermark using a first digital watermark embedding method, comprising:

means for detecting the first digital watermark in the media signal;
means for embedding message information from the first digital watermark into a second digital watermark in the media signal before the media signal undergoes a transformation process such that the second digital watermark is adapted to survive the transformation process.

20. (Original) A transmarker for transmarking a media signal previously embedded with a first digital watermark using a first digital watermark embedding method, comprising:

means for detecting the first digital watermark in the media signal;
means for converting the media signal to a different format;
means for embedding message information from the first digital watermark into a second digital watermark in the converted media signal such that the second digital watermark is adapted to robustness or perceptibility parameters associated with the new format.

REMARKS

After entry of the foregoing amendment, claims 1-20 remain pending in the application. Reconsideration is requested in view of the following remarks.

The typographical error noted by the Examiner in claim 16 has been corrected; the undersigned apologizes for the error.

The rejections under § 112 are respectfully traversed. The terms "perceptibility" and "perceptual" (in claims 10, 11, 13 and 20) are not used to vaguely refer to an unknown degree or threshold. Rather, they are used as adjectives that modify nouns (e.g., "parameter" or "quality").

These same two terms are found in the claims of 34 issued patents relating to digital watermarking (see listing from USPTO web site, attached as Exhibit A).

Because the terms are not used in to set a (vague) degree or threshold, but rather are used as adjectives to modify nouns, their use in the claims should not raise any § 112 issue.

In claim 16, the claim language refers to encoding with a lesser strength "*...so as to be less perceptible.*" While "perceptible" as an absolute measure could arguably be debated, an artisan would have no difficulty in assessing the relative determination of whether something is more perceptible or less perceptible. (The media signals that are processed accordingly to the claimed arrangement can represent various types of information, e.g., video, audio, image. If the media signal represented an image, then a claim reference to "less visible" would seem unobjectionable. Likewise, if the media signal represented audio, then a claim reference to "less audible" would likewise be unobjectionable. The "less perceptible" used in claim 16 is generic language embracing such a concept – independent of the particular media being used.)

Claims 1-5 and 8-20 stand rejected over Tewfik (6,272,634) in view of Yeung (6,587,944).

Tewfik concerns the problem that arises when two parties watermark a piece of content – each marking it as their own (one of them marking it untruthfully).

As described in column 2, lines 23-28, a pirate may take a previously-watermarked piece of content, and add his own watermark to it. The content then conveys two watermarks – each indicating a different owner.

One way Tewfik proposes addressing this dilemma is by tailoring the true owner's watermark (*i.e.*, the first watermark) so that it does not represent just ownership information, but also depends on the (unwatermarked) "host" content data prior to processing.¹ By this arrangement, the true owner can establish that he watermarked the content at a time that it included no other watermark, *i.e.*, that his watermark was applied first.

Rather than leading to applicant's claimed arrangement, Tewfik teaches away. For example, the second watermark with which Tewfik is concerned is the one applied by the pirate. The pirate's watermark desires to assert a different ownership than the first-applied watermark (*e.g.*, the first watermark may indicate OWNER=SMITH; the pirate-applied second watermark may falsely indicate OWNER=JONES). This is different than in the claimed arrangement, in which message information detected from the first watermark is embedded into the second watermark. (*E.g.*, the first claimed watermark may indicate OWNER=SMITH. This message is detected from the first watermark and at least part of it is embedded in the second watermark, so that the second watermark also indicates OWNER=SMITH).

In addition to the foregoing distinction, the claimed arrangement also specifies that the second watermark is adapted to survive a transformation process. For example, a watermark may originally be hidden in an audio signal at relatively high frequencies, *e.g.*, in the band 10 KHz – 20 KHz. However, if the audio signal is to be resampled at a lower Nyquist sampling rate, these high frequency signals at which the watermark is represented may not reproduce. The audio signal after transformation may have a bandwidth that only extends to 6 KHz. In this case, the second watermark referenced in claim 1 may employ a different steganographic encoding method to embed the message differently, *e.g.*, hiding it in low frequencies. By this arrangement, the second watermark (*i.e.*, the low frequency watermark) will reliably be conveyed in the new format, whereas the original watermark (*i.e.*, the high frequency watermark) would be lost.

¹

Abstract, last sentence.

Again, Tewfik has no teaching on this point. The “transform based watermarking techniques” of which Tewfik speaks (e.g., at bottom of column 5) simply mean that the information signal is represented in a different domain at the time it is altered to encode the watermark signal. In a popular example, rather than altering an image signal when it is represented by an array of pixels (e.g., by slightly increasing the luminance of selected pixels), a transform-based technique may convert the image information to the DCT domain, and then slightly alter the spatial frequency coefficients by which the image is represented in that domain. (The image information can then be transformed back into the pixel domain for display, etc.)

In addition to the foregoing two distinctions, Tewfik also does not teach a method of “transmarking” as required by claim 1. (As noted in the specification, “*Transmarking relates to converting auxiliary data embedded in a media signal from one digital watermark format to another.*”)

In view of the foregoing three issues, applicant respectfully submits that Tewfik does not teach the claim limitations for which it is cited, and claim 1 is thus properly patentable over Tewfik/Yeung.

In addition to the foregoing three issues, applicant respectfully submits that an artisan would have had no motivation to combine teachings of Tewfik and Yeung in the manner proposed. A motivation to combine generally requires recognition of a particular problem, coupled with an obvious realization that the problem can be addressed by borrowing teachings from another reference.²

“The factual inquiry whether to combine references must be thorough and searching.”³ The need for specificity in the rejection pervades the case law.⁴ “Particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.”⁵

² Recognition of a problem, alone, is not enough (and, moreover, is not present in this case). Case law establishes that an invention may be patentable even if the solution is obvious once the source of the problem is identified. *In re Zurko*, 111 F.3d 887 (Fed. Cir. 1997); *In re Sponnoble*, 405 F.2d 578 (CCPA 1969).

³ *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008 (Fed. Cir. 2001).

⁴ *In re Sang Su Lee*, 277 F.3d 1338 (Fed. Cir. 2002).

⁵ *In re Kotzah*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000).

The factual question of motivation is material to patentability, and can not be resolved on subjective belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to “[use] that which the inventor taught against its teacher.”⁶

In the present case, it appears that neither Tewfik nor Yeung recognized the problem addressed by the present inventor. Nor has any other art or teaching been cited which acknowledges this problem.

A conclusory statement that

“it is obvious at the time of the invention was made for one of ordinary skill in the art to implement the decoding teaching of Yeung with Tewfik information to decode the watermark and use the decoded message to imbed in the second watermark to a second security layer into the media signal or to further protecting the original watermark, instead of imbedding the watermarked original data which as the undecoded message information in Tewfik’s invention”

does not adequately address the issue of motivation to combine. There is no indication why an artisan – without knowledge of applicant’s invention – would have selected respective components of Tewfik’s and Yeung’s teachings for combination in the manner claimed.

⁶ In re Sang Su Lee, *ibid*, citing W.L. Gore v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983).

As such, applicant respectfully submits that lack of adequate motivation to combine is a further ground for withdrawal of the § 103 rejection (in addition to the three issues noted earlier).

Given such shortcomings, other points that might be made concerning the rejection, the art, and the claim, are not belabored.

The rejection of independent claim 13 suffers in the same ways. (Claim 13 differs from claim 1, e.g., in reciting that the media signal is converted to a different format, rather than reciting that the media signal undergoes a "transformation process.")

Likewise with independent apparatus claims 19 and 20.

The rejections of the other, dependent, claims are not addressed given the shortcomings in the rejections of the independent claims.

The Examiner is invited to telephone the undersigned if any further issue is thought to preclude issuance of a Notice of Allowance.

Date: December 10, 2004

CUSTOMER NUMBER 23735

Phone: 503-469-4800
FAX 503-469-4777

Respectfully submitted,

DIGIMARC CORPORATION

By _____

William Y. Conwell
Registration No. 31,943

USPTO PATENT FULL-TEXT AND IMAGE DATABASE[Home](#)[Quick](#)[Advanced](#)[Pat Num](#)[Help](#)[Bottom](#)[View Cart](#)

Searching 1976 to present...

Results of Search in 1976 to present db for:**((ACLM/perceptual OR ACLM/perceptibility) AND watermark\$): 34 patents.***Hits 1 through 34 out of 34*
 | ((ACLM/perceptual OR ACLM/perceptibility) AND watermark\$)

**PAT.
NO.**

- | PAT.
NO. | Title |
|-------------|---|
| 1 | 6,792,542 Digital system for embedding a pseudo-randomly modulated auxiliary data sequence in digital samples |
| 2 | 6,792,129 Digital watermarking in a perceptually uniform domain |
| 3 | 6,768,980 METHOD OF AND APPARATUS FOR HIGH-BANDWIDTH STEGANOGRAPHIC EMBEDDING OF DATA IN A SERIES OF DIGITAL SIGNALS OR MEASUREMENTS SUCH AS TAKEN FROM ANALOG DATA STREAMS OR SUBSAMPLED AND/OR TRANSFORMED DIGITAL DATA |
| 4 | 6,763,123 Detection of out-of-phase low visibility watermarks |
| 5 | 6,751,337 Digital watermark detecting with weighting functions |
| 6 | 6,748,362 Process, system, and apparatus for embedding data in compressed audio, image video and other media files and the like |
| 7 | 6,724,911 Robust digital watermarking |
| 8 | 6,718,045 Method and device for inserting a watermarking signal in an image |
| 9 | 6,714,683 Wavelet based feature modulation watermarks and related applications |
| 10 | 6,683,966 Watermarking recursive hashes into frequency domain regions |
| 11 | 6,674,876 Watermarking in the time-frequency domain |
| 12 | 6,671,387 Watermarking of a digitized image |
| 13 | 6,668,246 Multimedia data delivery and playback system with multi-level content and privacy protection |
| 14 | 6,633,654 Perceptual modeling of media signals based on local contrast and directional edges |
| 15 | 6,631,198 Perceptual modeling of media signals based on local contrast and directional edges |
| 16 | 6,611,608 Human visual model for data hiding |
| 17 | 6,600,836 Quality based image compression |
| 18 | 6,571,144 System for providing a digital watermark in an audio signal |

Exhibit A

- 19 6,529,634 [Contrast sensitive variance based adaptive block size DCT image compression](#)
20 6,522,767 [Optimization methods for the insertion, protection, and detection of digital watermarks in digitized data](#)
21 6,493,457 [Electronic watermarking in the compressed domain utilizing perceptual coding](#)
22 6,400,826 [System, method, and product for distortion-compensated information embedding using an ensemble of non-intersecting embedding generators](#)
23 6,381,341 [Watermark encoding method exploiting biases inherent in original signal](#)
24 6,373,974 [Method for extracting multiresolution watermark images to determine rightful ownership](#)
25 6,330,672 [Method and apparatus for watermarking digital bitstreams](#)
26 6,307,950 [Methods and systems for embedding data in images](#)
27 6,282,299 [Method and apparatus for video watermarking using perceptual masks](#)
28 6,278,792 [Robust digital watermarking](#)
29 6,256,736 [Secured signal modification and verification with privacy control](#)
30 6,226,387 [Method and apparatus for scene-based video watermarking](#)
31 6,128,736 [Method for inserting a watermark signal into data](#)
32 6,111,844 [Quality degradation through compression/decompression](#)
33 6,061,793 [Method and apparatus for embedding data, including watermarks, in human perceptible sounds](#)
34 6,031,914 [Method and apparatus for embedding data, including watermarks, in human perceptible images](#)
-

